

# Installation Instructions

334 &  
334S  
Series A

## GAS-FIRED DUCT FURNACE

bryant

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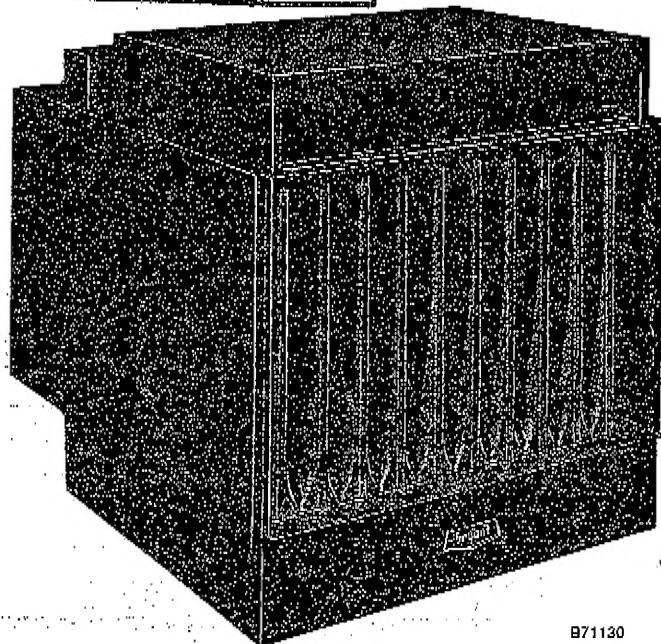


39003D1  
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Before proceeding to install Models 334 and 334S Duct Furnace, refer to Bryant form No. 39003D1, "Procedure for Gas Appliances," (packaged with the equipment) for information concerning combustion, venting, piping, and other standard installation practices. The current edition of the American National Standard "Installation of Gas Appliances and Gas Piping," Z21.30, takes precedence over all other reference publications pertinent to this installation instruction. Both models are shipped factory-assembled. Installation comprises the following:

- \* I. Inspection
- \* II. Location and Suspension
- \* III. Gas Piping
- IV. Duct Connections
- V. Wiring
- \* VI. Venting
- VII. Start-up and Adjustment
- VIII. Service and Maintenance

\*To perform these sections (or installation steps), refer to the appropriate sections of Bryant form No. 39003D1 (packaged with this equipment).



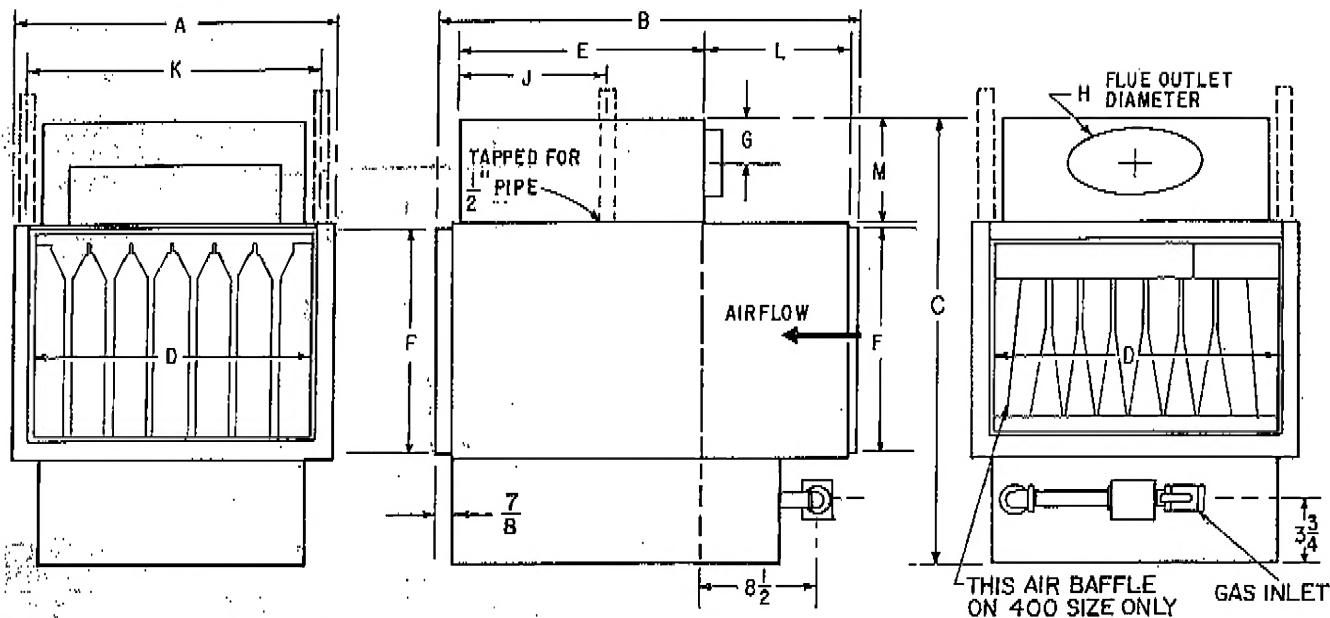
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Figure 1

TABLE I—Control Options

COMPONENT	PROPANE GAS D2	NATURAL D4	NATURAL D5
Bryant Pilot		X	X
*Bryant Gas Valve	X	X	X
*Gas Pressure Regulator		X	X
Transformer	X	X	X
Modulator	X		X
100% Shutoff	X		X
Thermocouple	X		X
Pilot Relay			X
Pilotstat	X		

\*A-643 Bryant gas valve with integral gas pressure regulator is used on D4 and D5 for sizes 30 thru 150; A-641 less regulator is used on D2 for all sizes. A-641 with separate gas pressure regulator is used on D4 and D5 for sizes 175 thru 400.

**DIMENSIONS****Figure 2 - Dimensional Drawing**

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**TABLE II - Dimensions in Inches**

Size	A	B	C	D	E	F	G	H	J	K	L
50	15-1/2	30-3/4	30	13-13/16	18-7/8	18-9/16	2-1/8	4	12-1/8	14-1/8	4-5/16
75	18-1/2	30-3/4	30	16-13/16	18-7/8	18-9/16	2-1/8	5	12-1/8	17-1/8	4-5/16
100	21-1/2	30-3/4	31-1/2	19-13/16	18-7/8	18-9/16	2-11/16	5	12-1/8	20-1/8	5-13/16
125	24-1/2	30-3/4	31-1/2	22-13/16	18-7/8	18-9/16	2-7/8	6	12-1/8	23-1/8	5-13/16
150	21-1/2	40-3/4	34-1/2	19-13/16	23-7/8	21-9/16	2-7/8	7	14-1/4	20-1/8	5-13/16
175	24-1/2	40-3/4	34-1/2	22-13/16	23-7/8	21-9/16	2-7/8	7	14-1/4	23-1/8	5-13/16
200	27-1/2	40-3/4	34-1/2	25-13/16	23-7/8	21-9/16	2-7/8	8	14-1/4	26-1/8	5-13/16
250	33-1/2	40-3/4	34-1/2	31-13/16	23-7/8	21-9/16	2-7/8	8	14-1/4	32-1/8	5-13/16
300	39-1/2	40-3/4	36-1/2	37-13/16	23-7/8	21-9/16	3-7/8	9	14-1/4	38-1/8	7-13/16
400	51-1/2	40-3/4	38	49-13/16	23-7/8	21-9/16	4-5/8	10	14-1/4	50-1/8	9-5/16

**Table III - Gas Connections and Weights**

Size	Gas Connection Size		Approximate Shipping Weight
	Natural	Propane	
50	1/2	1/2	120
75	1/2	1/2	140
100	1/2	1/2	163
125	1/2	1/2	180
150	1/2	1/2	210
175	1/2	1/2	230
200	1/2	1/2	275
250	3/4	3/4	330
300	3/4	3/4	410
400	3/4	3/4	560

TABLE IV - Capacities and Ratings - 334 Duct Furnace

Size & Model	AGA Rating BTU/Hr <sup>†</sup>	Air Temperature Rise Through Furnace													
		Input	Output	30	35	40	45	50	55	60	65	70	75	80	85
50-334	40,000	CFM P.D.*	1240 0.138	1060 0.102	925 0.078	825 0.059	740 0.049	670 0.039	620 0.033	570 0.029	530 0.025	500 0.022	465 0.019	435 0.017	415 0.015
75-334	60,000	CFM P.D.*	1860 0.150	1590 0.126	1390 0.097	1235 0.073	1110 0.061	1010 0.048	925 0.041	855 0.036	795 0.031	745 0.027	695 0.024	660 0.021	620 0.019
100-334	80,000	CFM P.D.*	2475 0.240	2110 0.176	1850 0.135	1645 0.105	1480 0.086	1345 0.070	1230 0.059	1140 0.051	1055 0.044	990 0.039	925 0.034	875 0.030	825 0.027
125-334	100,000	CFM P.D.*	3100 0.280	2640 0.205	2315 0.156	2060 0.122	1850 0.100	1685 0.081	1545 0.068	1425 0.059	1320 0.051	1285 0.045	1160 0.039	1095 0.035	1035 0.031
150-334	120,000	CFM P.D.*	3720 0.492	3180 0.360	2780 0.275	2470 0.214	2220 0.175	2020 0.143	1850 0.121	1710 0.104	1590 0.089	1480 0.078	1390 0.068	1240 0.061	1035 0.053
175-334	140,000	CFM P.D.*	4320 0.492	3700 0.360	3240 0.275	2886 0.214	2590 0.175	2360 0.143	2160 0.121	1995 0.104	1850 0.089	1725 0.078	1620 0.068	1525 0.061	1445 0.053
200-334	160,000	CFM P.D.*	4950 0.492	4240 0.360	3700 0.275	3290 0.214	2960 0.175	2695 0.143	2465 0.121	2280 0.104	2120 0.089	1975 0.078	1850 0.068	1740 0.061	1650 0.053
250-334	200,000	CFM P.D.*	6200 0.492	5280 0.360	4630 0.275	4110 0.214	3700 0.175	3370 0.143	3090 0.121	2850 0.104	2640 0.089	2460 0.078	2315 0.068	2180 0.061	2070 0.053
300-334	240,000	CFM P.D.*	7425 0.492	6360 0.360	5560 0.275	4940 0.214	4440 0.175	4040 0.143	3700 0.121	3420 0.104	3180 0.089	2960 0.078	2780 0.068	2620 0.061	2475 0.053
400-334	320,000	CFM P.D.*	9900 0.492	8480 0.360	7400 0.275	6580 0.214	5920 0.175	5390 0.143	4930 0.121	4560 0.104	4240 0.089	3960 0.078	3700 0.068	3480 0.061	3300 0.053

<sup>†</sup>Ratings are approved for altitudes to 2,000 feet for all gases. Ratings for altitudes over 2,000 feet are 4% less for each 1,000 feet above sea level.

\*Pressure Drop through Unit inches water column.

Minimum range settings are preset at factory.

Temperature rises above 80° limited to use with blower and adapter specified, attached directly to inlet of the Duct Furnace.

### **Special Airplane Hangar and Garage Application Precautions**

**NOTE:** Refer to NFPA No. 406-1966, "Standard on Aircraft Hangars, and NFPA No. 88-1962, "Standard for Garages."

1. A clearance of 10 feet to the bottom of the Furnace from the top of a wing or fuselage of aircraft likely to be housed in the hangar must be maintained.
2. A minimum clearance of 8 feet from the floor to the bottom of the Furnace in other sections of the aircraft hangar, such as offices and shops which communicate with areas used for servicing or storage, must be maintained.
3. The Furnace must also be so located that it is protected from damage by aircraft or other objects such as cranes or movable scaffoldings. In addition, it must be located to be accessible for servicing and adjustment.
4. A clearance of 6 inches from combustible material must be maintained from the top and the sides of the Heater.
5. A service clearance of 18 inches at the rear and 12 inches from any obstruction at the bottom of the Furnace must be maintained.

### **Specific Location and Suspension Precautions**

For general location and suspension information, refer to Section II of Bryant form No. 39003D1. In addition, the following precautions should be observed when selecting a mounting site.

1. Do not locate the Furnace in areas where combustion air is limited.
2. If located in spaces equipped with exhaust fans, provide sufficient makeup air.
3. When hanging the unit, install the ceiling support for pipe hangers, then install the hangers. The top casing of the unit is tapped for two 1/2-inch pipe hangers. It is recommended that pipe unions be used to join the Furnace to pipe hangers. If possible, use a hoist to pull the Furnace into position. Hang the unit as nearly vertical as possible.

**WARNING:** Never locate the Furnace in a paint room, or near areas where there is danger of explosive gas mixtures.

**CAUTION:** Never locate the Furnace near an acid bath, degreaser tank, or area with corrosive atmosphere.

### **IV. DUCT CONNECTIONS**

#### **Circulating Air and Air Duct**

1. The Model 334 Duct Furnace is equipped with flanges for ease of attachment of ductwork.

When it is required to change the cross-sectional area of the connecting ductwork, it is recommended that the slope of the transition piece be 1 inch in 7 inches. The slope should never exceed 1 inch in 4 inches.

2. Provide an access panel in the duct on both the upstream and downstream sides of the Furnace. These openings must be accessible when the Furnace is in service, and must be large enough that smoke or reflected light can be observed inside the casing when the heat exchanger is being tested for leakage. The covers for these openings should be attached in such a manner that they will provide adequate seals against air leakage.
3. The direction of flow or circulating air through the Furnace is plainly marked on Models 982 and 983 Blower casings. This flow direction must never be reversed.
4. The Furnace is approved for installation downstream from a refrigeration coil. When so installed, make provisions to dispose of the condensate through the 1/2-inch drain pipe connection in the bottom of the Furnace. If a bypass arrangement is used, it is not necessary to make these drain provisions.

If the Duct Furnace is located on the intake side of an air conditioning unit, precautions should be taken to see that the fan motor and refrigeration system of the air conditioning unit do not become damaged by the high temperature of the Furnace discharge air.

5. Make sure that the supply of circulating air is sufficient. See Table IV, "Capacities and Ratings." Make certain that the inlet temperature of this air is not too high. It should not exceed 90°F.

When the Furnace is "off," with cool air passing through it, condensation may form on an unprotected casing. If this occurs, install additional insulation to the Furnace casing.

In a crawl space, provide a vapor barrier on the ground and vent the crawl space.

In a basement where there is an unusual amount of moisture from wall or floor seepage, install additional insulation to the Furnace casing—plus an adequate vapor barrier.

## V. ELECTRICAL CONNECTIONS

The Model 334 Duct Furnace is completely wired at the factory and is ready for connection to the external power source and to the room thermostat if used. Note that the Furnace is equipped with a dual-voltage transformer for either 115 or 230 volts. Insulate the end of the unused wire on the primary side of the transformer. A wiring diagram is attached to the furnace. The same diagram is included in this instruction. Be sure to refer to the wiring diagram when making field connections. All external wiring should be made in accordance with the National Electrical Code and any local ordinances that may apply.

**NOTE:** Do not fasten a thermostat to the Furnace casing.

## VII. START-UP AND ADJUSTMENT

1. Start the unit. Use the procedure outlined on the lighting instruction plate attached to the Furnace.

**NOTE:** On units equipped with an A-643 gas control valve, there are three positions for the manual valve knob (OFF-PILOT-ON). There is a positive stop at the PILOT position. To move the manual valve knob from the PILOT position to either ON or OFF position, the manual valve knob must be depressed.

2. Adjust the pilot flame. The adjusting screw under the screw cap on the pilot valve is used for this purpose.

To adjust the pilot flame on units equipped with a Model A-643 valve, the adjustment screw is located in the pilot outlet portion of the valve body. Remove the capscrew, make the necessary adjustment, and replace the capscrew.

For D4 controls, the flame should be long enough for good impingement on the metal element of the Bryant pilot. For D5 and D2 controls, the flame should surround the thermocouple element of the pilot and extend downward to include 3/8 to 1/2 inch of the thermocouple. The flame should never come in contact with any other part of the thermocouple or its lead wire.

3. Check the input. The input should be checked at the meter to make sure that it corresponds with the input shown on the rating plate attached to the unit. See Bryant form No. 39003D1 for the method.

4. Final Checkout. Move the thermostat setting above and below room temperature several times, pausing between each "on" and "off" cycle to make sure that the main burners ignite properly.

Attach a low-voltage test light to the electrical leads of the gas valve. With the thermostat set above room temperature, close the manual pilot valve. If the test light goes out when the pilot cools, the pilot is functioning properly. The test light should go out within 45 seconds after the pilot gas supply is turned off.

**NOTE:** This check does not apply to units equipped with Model A-643 gas valves.

Check the operation of the temperature limit control. This can be done by allowing the burners to operate while the remote air mover is not running to see that the limit switch opens.

Check all connections in the gas piping for leaks. Use a soap-and-water solution.

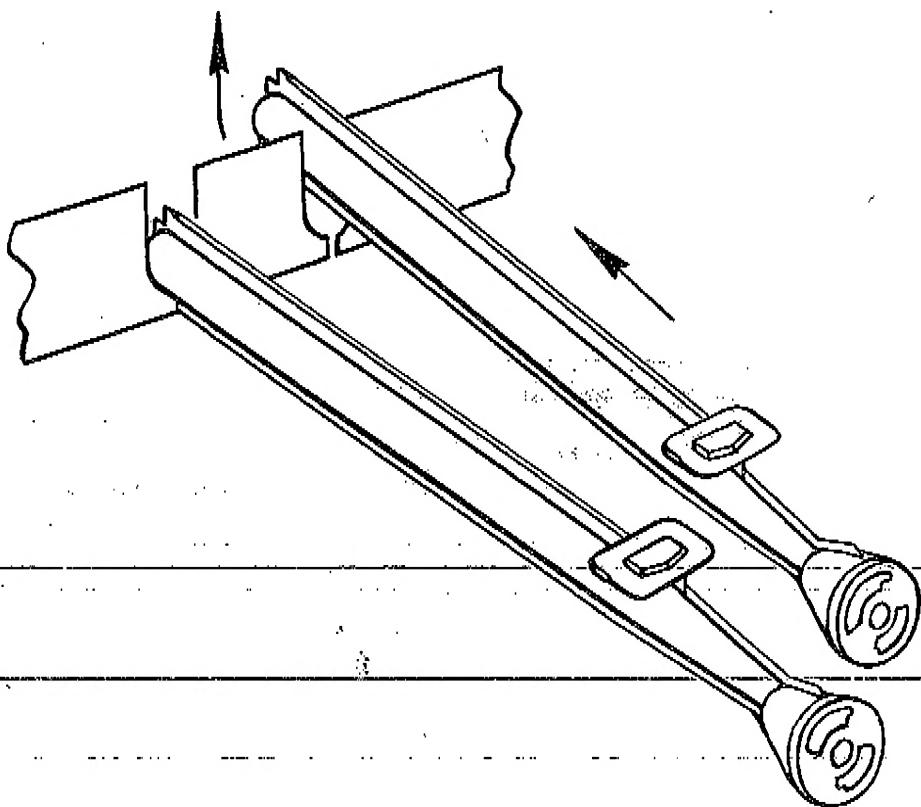
**WARNING:** Never use a flame to check for leaks.

## VIII. SERVICE AND MAINTENANCE

1. Pilot Orifice - is located in the bottom fitting of the pilot and is readily accessible for inspection and cleaning.
2. Main Burner Orifices - are an integral part of the orifice spuds on the manifold. The orifice assembly is readily unscrewed from the manifold after the burner is removed.
3. Removing Main Burners - See Figure 3. Lift the rear of the burner and push it away from manifold enough to disengage the orifice spud from the mixer shield. Then pull down and out of the Furnace. The end of the burner away from the manifold seats in a slotted burner support. It is necessary to lift the burner out of this slot before attempting to push the burner back.

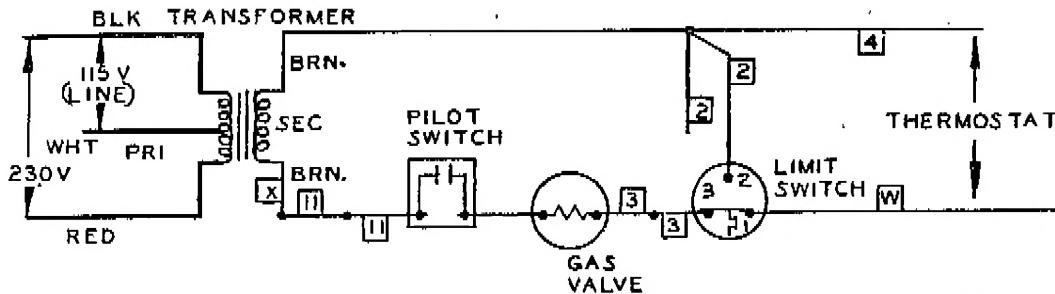
NOTE: Disconnect the pilot tubing and wires to remove the burner that holds the pilot. However, it is not necessary to remove the pilot itself from the burner.

4. Cleaning - Heat exchanger tubes should be inspected at regular intervals and cleaned when necessary.
  - a. Shut off the gas and electricity. The Furnace should be cool.
  - b. Disconnect tubes and wires from the pilot.
  - c. Remove the main burners and pilot.
  - d. Use a stiff brush to scrub the heat exchanger tubes. Remove all loose scale and any soot that may have collected.
  - e. Replace the burners and pilot. Reconnect the pilot gas and electricity.
  - f. The unit is now ready for relighting.



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Figure 3 - Removing Burner.

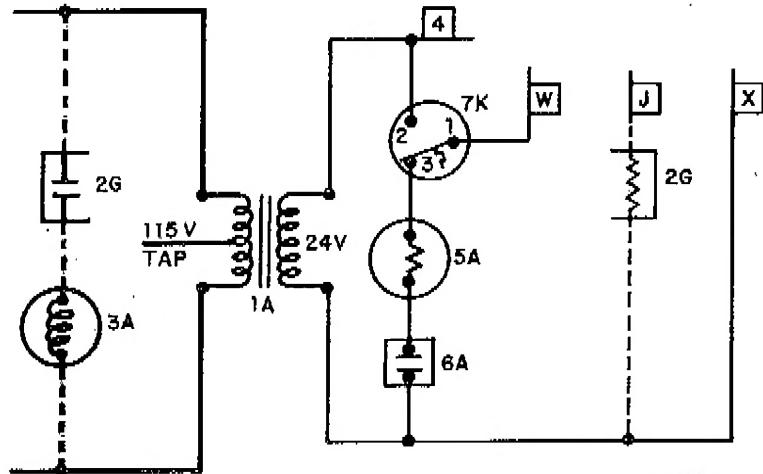


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---- FIELD WIRING  
— FACTORY LOW VOLTAGE  
— FACTORY LINE VOLTAGE

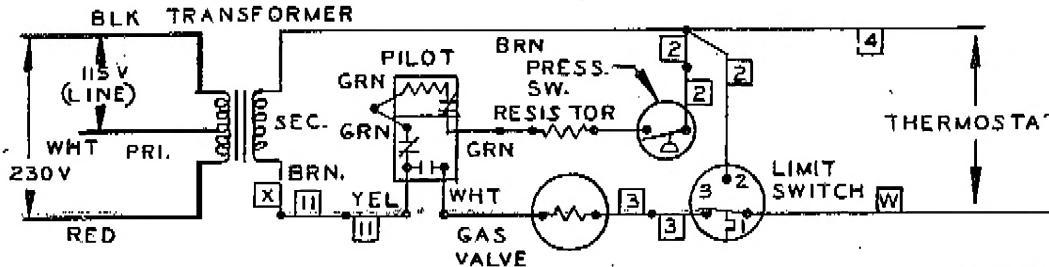
## LEGEND

- 1A Transformer
- 3A Blower Motor (Optional)
- 5A Automatic Gas Valve
- 6A Pilot Switch (None on Propane)
- 2G 821/822\*Blower Relay (Optional)
- 7K Temp Limit Control—SPDT-N.C.



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**Figure 4 - Wiring, Model 334 with 732 pilot.**

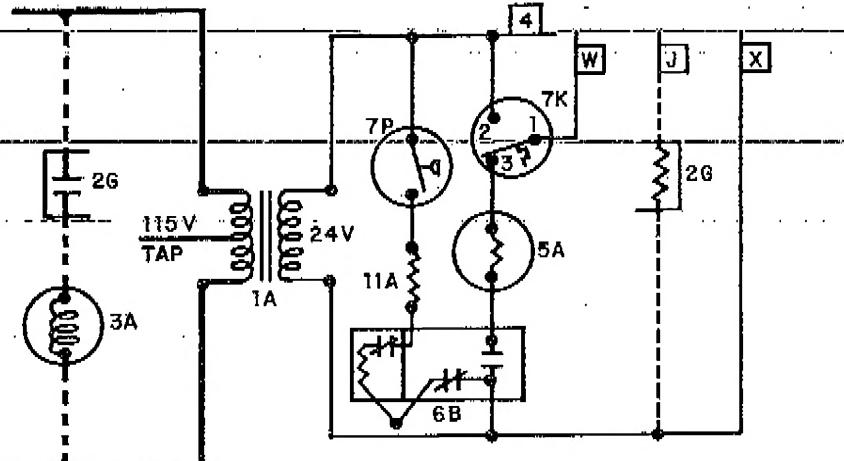


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---- FIELD WIRING  
— FACTORY LOW VOLTAGE  
— FACTORY LINE VOLTAGE

**—LEGEND**

- 1A Transformer
- 3A Blower Motor (Optional)
- 5A Automatic Gas Valve
- 6B Pilot with Auto. Ignition Coil
- 2G 821/822\* Blower Relay (Optional)
- 7K Temp Limit Control—SPDT-N.C.
- 7P Pressure Switch—SPST-N.C.
- 11A Resistor



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**Figure 5 - Wiring, Model 334 with 733 pilot.**

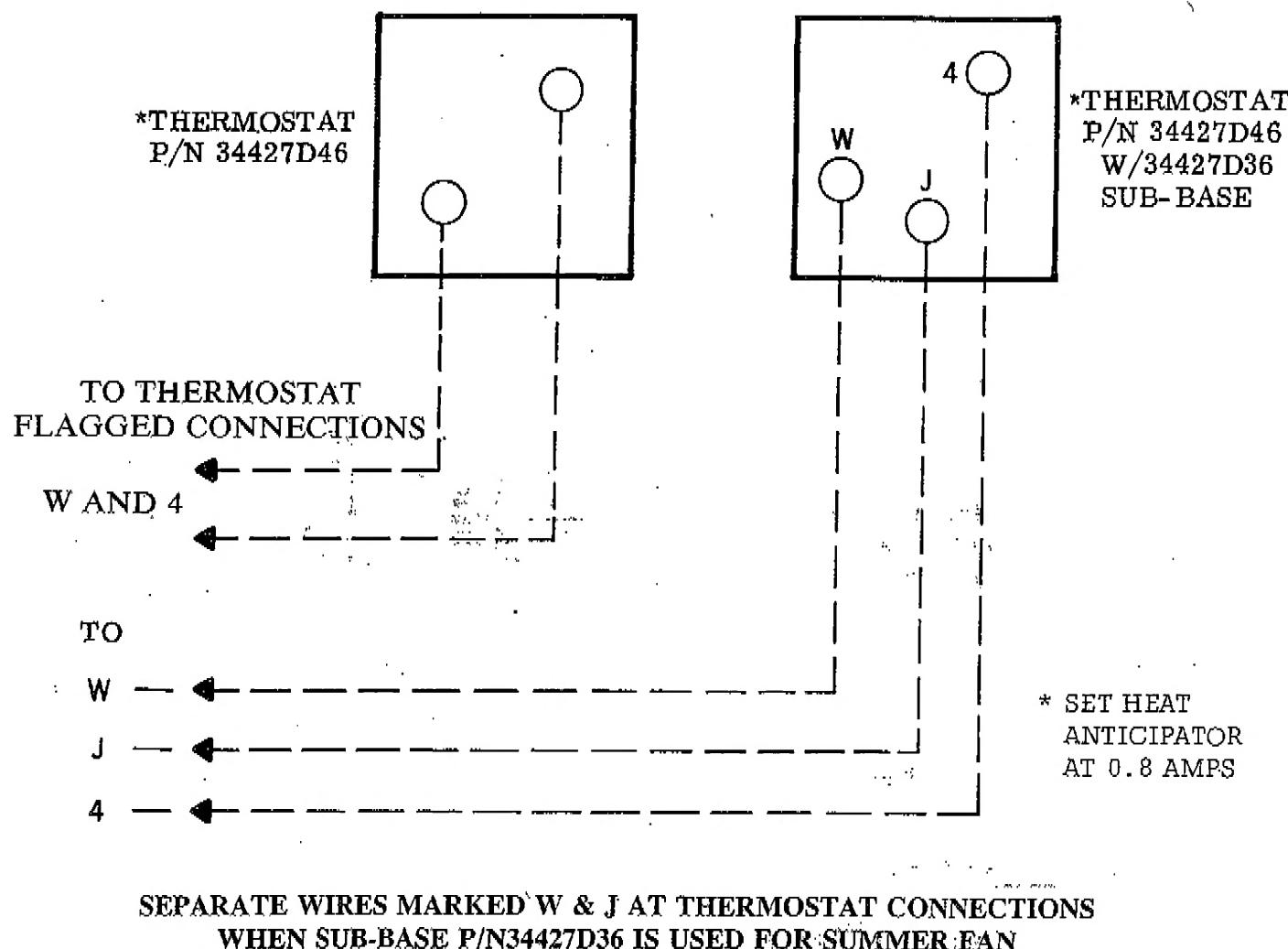


Figure 6 - Thermostat Field Wiring, Model 334.

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